

FACT SHEET FOR NPDES PERMIT WA-002395-7
GIG HARBOR WASTEWATER TREATMENT PLANT

SUMMARY

The City of Gig Harbor owns and operates the wastewater treatment facility located in the city of Gig Harbor. The treatment facility consists of an activated sludge - secondary treatment system.

The facility primarily treats domestic waste water from residential and light commercial activities in Gig Harbor. The secondary treated effluent from the facility is discharged into the waters of Gig Harbor.

During the existing permit term, the Permittee conducted a dye study and a mixing zone analysis as required in the permit, to determine the effluent dilution achieved in the permitted mixing zone in Gig Harbor.

The proposed permit includes effluent limitations for conventional pollutants and chlorine. It also includes sampling and monitoring of the receiving waters to ensure that the discharge from the facility does not violate the applicable receiving water quality standards, and to provide data that can be used to monitor long-term water quality trends in Gig Harbor due to the effects of the discharge from the facility.

TABLE OF CONTENTS

INTRODUCTION	4
BACKGROUND INFORMATION	5
DESCRIPTION OF THE FACILITY	5
History.....	5
Wastewater Sources	5
Wastewater Characteristics	5
Description of the Wastewater Collection System	5
Description of the Wastewater Treatment Facility	5
Residual Solids.....	6
PERMIT STATUS.....	6
SUMMARY OF INSPECTIONS	6
SUMMARY OF COMPLIANCE WITH THE EXISTING PERMIT	6
PROPOSED PERMIT LIMITATIONS.....	7
DESIGN CRITERIA	7
TECHNOLOGY-BASED EFFLUENT LIMITATIONS	8
SURFACE WATER QUALITY-BASED EFFLUENT LIMITATIONS	9
Numerical Criteria for the Protection of Aquatic Life.....	9
Numerical Criteria for the Protection of Human Health.....	9
Narrative Criteria	9
Antidegradation.....	9
Critical Conditions	10
Mixing Zones	10
Description of the Receiving Water.....	10
Surface Water Quality Criteria	10
Consideration of Surface Water Quality-based Limits for Numeric Criteria	11
Whole Effluent Toxicity	15
Human Health	16
Sediment Quality	16
GROUND WATER QUALITY LIMITATIONS.....	16
COMPARISON OF PROPOSED EFFLUENT LIMITS WITH THE EXISTING EFFLUENT LIMITS	16
MONITORING REQUIREMENTS	17
LAB ACCREDITATION	17
RECEIVING WATER QUALITY MONITORING	18
OTHER PERMIT CONDITIONS	19
REPORTING AND RECORDKEEPING	19
PREVENTION OF FACILITY OVERLOADING	19
OPERATION AND MAINTENANCE (O&M).....	19
RESIDUAL SOLIDS HANDLING.....	19
PRETREATMENT	19
ADDITIONAL TESTING OF EFFLUENT	19
GENERAL CONDITIONS	19

FACILITY NAME: Gig Harbor Wastewater Treatment Plant

PERMIT ISSUANCE PROCEDURES	20
PERMIT MODIFICATIONS	20
RECOMMENDATION FOR PERMIT ISSUANCE	20
REFERENCES FOR TEXT AND APPENDICES.....	20
APPENDIX A—PUBLIC INVOLVEMENT INFORMATION.....	21
APPENDIX B—GLOSSARY	22
APPENDIX C—TREATMENT FACILITY LAYOUT AND OUTFALL LOCATION	27
APPENDIX D—LIST OF POLLUTANTS FOR TESTING IN CONDITION S2.A(4).....	29
APPENDIX E—REASONABLE POTENTIAL CALCULATIONS FOR TOXICS	30
APPENDIX F—RESPONSE TO COMMENTS	33

INTRODUCTION

The Federal Clean Water Act (FCWA, 1972, and later modifications, 1977, 1981, and 1987) established water quality goals for the navigable (surface) waters of the United States. One of the mechanisms for achieving the goals of the Clean Water Act is the National Pollutant Discharge Elimination System of permits (NPDES permits), which is administered by the Environmental Protection Agency (EPA). The EPA has delegated responsibility to administer the NPDES permit program to the State of Washington on the basis of Chapter 90.48 RCW which defines the Department of Ecology's authority and obligations in administering the wastewater discharge permit program.

The regulations adopted by the State include procedures for issuing permits (Chapter 173-220 WAC), technical criteria for discharges from municipal wastewater treatment facilities (Chapter 173-221 WAC), water quality criteria for surface and ground waters (Chapters 173-201A and 200 WAC), and sediment management standards (Chapter 173-204 WAC). These regulations require that a permit be issued before discharge of waste water to waters of the state is allowed. The regulations also establish the basis for effluent limitations and other requirements which are to be included in the permit. One of the requirements (WAC 173-220-060) for issuing a permit under the NPDES permit program is the preparation of a draft permit and an accompanying fact sheet. Public notice of the availability of the draft permit is required at least thirty (30) days before the permit is issued (WAC 173-220-050). The fact sheet and draft permit are available for review (see Appendix A—Public Involvement of the fact sheet for more detail on the public notice procedures).

The fact sheet and draft permit have been reviewed by the Permittee. Errors and omissions identified in this review have been corrected before going to public notice. After the public comment period has closed, the Department will summarize the substantive comments and the response to each comment. The summary and response to comments will become part of the file on the permit and parties submitting comments will receive a copy of the Department's response. The fact sheet will not be revised. Comments and the resultant changes to the permit will be summarized in Appendix F—Response to Comments.

GENERAL INFORMATION	
Applicant	City of Gig Harbor
Facility Name and Address	City of Gig Harbor Wastewater Treatment Plant 4216 Harborview Drive, Gig Harbor, WA (Pierce County)
Type of Treatment	Activated Sludge - Secondary Treatment System
Discharge Location	Gig Harbor, Puget Sound Latitude: 47° 20' 10" N Longitude: 122° 35' 05" W
Water Body ID Number	07-15-07

BACKGROUND INFORMATION

DESCRIPTION OF THE FACILITY

HISTORY

The original wastewater treatment facility was built in the early to mid-1970s. Most of the wastewater collection system was constructed in the 1970s or later, and is expected to have much less inflow and infiltration than found in the older collection system. The treatment facility has been modified several times since its initial construction. The last significant facility upgrade and expansion was completed in 1997, which increased its hydraulic capacity from 0.7 MGD to 1.6 MGD (maximum monthly average flows). This upgrade also provided the ability to process the sewage sludge (biosolids) to meet Class A biosolids pathogen and vector attraction standards.

WASTEWATER SOURCES

Primary sources of wastewater tributary to the facility are domestic sewage from residential and light commercial activities in Gig Harbor.

WASTEWATER CHARACTERISTICS

Waste water received at the facility is fairly typical domestic waste water with conventional pollutants and low levels of some metals. The treatment plant is currently operating well below its approved hydraulic and organic design capacities.

DESCRIPTION OF THE WASTEWATER COLLECTION SYSTEM

The collection system consists of gravity sewers, force mains, and seventeen lift stations. The majority of the gravity sewer pipes are PVC. Some of the larger diameter pipes are concrete and some pipes on steep slopes are ductile iron. The downtown portion of the collection system was constructed under ULID number 1 in the mid-1970's. ULID number 2 was constructed in the late 1980's to serve the areas to the south of Gig Harbor. ULID number 3 was constructed in the early 1990's to serve the areas to the north of Gig Harbor. In August 2002, the Wollochet Harbor wastewater treatment plant was eliminated by intercepting and redirecting the wastewater flows to the Gig Harbor wastewater treatment facility.

The infiltration and inflow (I/I) analysis indicate "non-excessive" I/I under EPA criteria. Over the years, the City has made efforts to reduce major sources of I/I in the system.

DESCRIPTION OF THE WASTEWATER TREATMENT FACILITY

The liquid treatment system at the facility includes an influent flow meter, a cyclone degritter, two rotary screens, three aeration basins, two secondary clarifiers, three chlorine contact chambers for disinfection, a sodium bisulfite dechlorination system, two effluent discharge pumps, and an effluent flow meter. More recent operational changes at the facility allow the aeration basins to be operated in either a complete mix activated sludge system mode or an extended aeration system mode. Depending on how the mixed liquor in the aeration basins responds to changing temperatures, the activated sludge system is operated as an extended aeration system or a complete mix activated sludge system.

The solids digestion system at the facility was converted more recently from autothermal thermophilic sludge digester (ATAD) and a screw press system to a system of six separate sludge tanks for aerobic digestion, thickening, and holding. In addition, the solids treatment system at the facility includes a centrifuge for dewatering the thickened sludge.

The secondary treated effluent is discharged to Gig Harbor, Puget Sound, via an outfall pipe equipped with a two-port diffuser. The outfall pipe consists of a 10-inch ductile iron pipe extending approximately 2,900 feet from the treatment facility to the discharge location in the northwest region of the harbor at a depth of approximately 23 feet MLLW. The effluent goes through a 90-degree vertical bend and then splits into the two ports via a tee assembly. The tee rests on a two-foot riser, for a discharge depth of approximately 21 feet MLLW.

Diagrams showing the treatment facility and the existing outfall location are included in Appendix C.

RESIDUAL SOLIDS

The treatment facilities remove solids during the treatment of waste water at the headworks (grit and screenings), and in the secondary clarifiers (sludges or biosolids). The solids removed at the headworks (grit, rags, screenings, etc.) are drained and disposed of as solid waste at a local landfill.

The sludge (biosolids) removed in the secondary clarifier is aerobically digested and thickened in sludge tanks. The thickened sludge is dewatered with a centrifuge, and then transported to:

- (i) South Sound Soils in Tenino, Washington, for composting, or
- (ii) Tacoma wastewater treatment plant for further treatment and composting.

PERMIT STATUS

The existing permit for this facility was issued on August 15, 1997. This permit expired on June 30, 2002. An application for permit renewal was submitted to the Department on December 26, 2001, and accepted by the Department on May 13, 2002. Due to administrative backlog, the existing permit was extended by the Department on June 14, 2002. The facility is currently operating under the terms and conditions of this permit.

SUMMARY OF INSPECTIONS

A Class II inspection of the facility was conducted on April 23, 2002, by the Department's Northwest Regional Office (NWRO) staff. In addition, Class I and Class II inspections of the facility were conducted on June 17, 2003, by the NWRO staff. At the time of inspections, the facility appeared to be well operated and maintained. The effluent appeared murky during the April 2002 Class II inspection. The effluent appeared foggy during the June 2003 Class II inspection. The inspection reports are on file at the NWRO.

SUMMARY OF COMPLIANCE WITH THE EXISTING PERMIT

The existing permit was issued on August 15, 1997, and expired on June 30, 2002. As stated above, this permit has been extended by the Department. Based on discharge monitoring reports (DMRs) submitted to the Department, there were only two violations of the effluent limits during the term of this permit. The maximum daily effluent limit for chlorine is 0.22 mg/l. In the

month of January 2002, the reported maximum daily effluent chlorine concentration was 0.38 mg/l. This violation occurred due to a mechanical failure of the dechlorination equipment. The other violation occurred in July 2003, when the average weekly effluent TSS was 53 mg/l. The average weekly permit limit for effluent TSS is 45 mg/l.

PROPOSED PERMIT LIMITATIONS

Federal and State regulations require that effluent limitations set forth in an NPDES permit must be either technology- or water quality-based. Technology-based limitations for municipal discharges are set by regulation (40 CFR 133, and Chapters 173-220 and 173-221 WAC). Water quality-based limitations are based upon compliance with the surface water quality standards (Chapter 173-201A WAC), ground water standards (Chapter 173-200 WAC), sediment quality standards (Chapter 173-204 WAC) or the National Toxics Rule (Federal Register, Volume 57, No. 246, Tuesday, December 22, 1992.) The most stringent of these types of limits must be chosen for each of the parameters of concern. Each of these types of limits is described in more detail below.

The limits in this permit are based in part on information received in the application. The effluent constituents in the application were evaluated on a technology- and water quality-basis. The limits necessary to meet the rules and regulations of the State of Washington were determined and included in this permit. Ecology does not develop effluent limits for all pollutants that may be reported on the application as present in the effluent. Some pollutants are not treatable at the concentrations reported, are not controllable at the source, are not listed in regulation, and do not have a reasonable potential to cause a water quality violation. Effluent limits are not always developed for pollutants that may be in the discharge but not reported as present in the application. In those circumstances the permit does not authorize discharge of the non-reported pollutants. Effluent discharge conditions may change from the conditions reported in the permit application. If significant changes occur in any constituent, as described in 40 CFR 122.42(a), the Permittee is required to notify the Department of Ecology. The Permittee may be in violation of the permit until the permit is modified to reflect additional discharge of pollutants.

DESIGN CRITERIA

In accordance with WAC 173-220-150 (1) (g), flows or waste loadings shall not exceed approved design criteria.

The design criteria for this treatment facility are taken from *City of Gig Harbor Wastewater Treatment Plant Facility Plan, Gray and Osborne, Inc., 1994*. The design criteria for the TSS loading are taken from *City of Gig Harbor Wastewater Treatment Plant Improvements Engineering Report, H.R. Esvelt Engineering, April 2003*. The design criteria for the treatment facility are as follows:

Design Criteria for Gig Harbor WWTP:

Parameter	Design Criteria
Average flow for the maximum month	1.6 MGD
BOD ₅ influent loading for the maximum month	3,680 lbs./day
TSS influent loading for the maximum month	3,680 lbs./day

TECHNOLOGY-BASED EFFLUENT LIMITATIONS

Municipal wastewater treatment plants are a category of discharger for which technology-based effluent limits have been promulgated by federal and state regulations. These effluent limitations are given in the Code of Federal Regulations (CFR) 40 CFR Part 133 (federal) and in Chapter 173-221 WAC (state). These regulations are performance standards that constitute all known available and reasonable methods of prevention, control, and treatment for municipal waste water.

The following technology-based limits for pH, fecal coliform, CBOD₅, and TSS are taken from Chapter 173-221 WAC:

Table 1: Technology-based Limits.

Parameter	Limit
pH	shall be within the range of 6 to 9 standard units.
Fecal Coliform Bacteria	Monthly Geometric Mean = 200 organisms/100 mL Weekly Geometric Mean = 400 organisms/100 mL
CBOD ₅ (concentration)	Average Monthly Limit is the most stringent of the following: - 25 mg/L - may not exceed fifteen percent (15%) of the average influent concentration Average Weekly Limit = 40 mg/L
TSS (concentration)	Average Monthly Limit is the most stringent of the following: - 30 mg/L - may not exceed fifteen percent (15%) of the average influent concentration Average Weekly Limit = 45 mg/L

Note: The Permittee has requested substitution of 5-day carbonaceous biochemical oxygen demand (CBOD₅) for the standard biochemical oxygen demand (BOD₅) limitations. As allowed by the federal and state regulations, the effluent BOD₅ limits in the permit have been substituted with CBOD₅ limits. The average monthly and weekly limits for CBOD₅ are 5 mg/l lower than the standard BOD₅ limits.

The following technology-based mass limits are based on WAC 173-220-130(3)(b) and 173-221-030(11)(b).

Monthly average effluent mass loadings for CBOD₅ = 1.6 MGD (maximum monthly design flow) x 25 mg/L (concentration limit) x 8.34 (conversion factor) = 334 lbs/day.

Monthly average effluent mass loadings for TSS = 1.6 MGD (maximum monthly design flow) x 30 mg/L (concentration limit) x 8.34 (conversion factor) = 400 lbs/day.

Weekly average effluent mass loadings for CBOD₅ = 1.6 MGD (maximum monthly design flow) x 40 mg/L (concentration limit) x 8.34 (conversion factor) = 534 lbs/day.

Weekly average effluent mass loadings for TSS = 1.6 MGD (maximum monthly design flow) x 45 mg/L (concentration limit) x 8.34 (conversion factor) = 600 lbs/day.

SURFACE WATER QUALITY-BASED EFFLUENT LIMITATIONS

In order to protect existing water quality and preserve the designated beneficial uses of Washington's surface waters, WAC 173-201A-060 states that waste discharge permits shall be conditioned such that the discharge will meet established surface water quality standards. The Washington State surface water quality standards (Chapter 173-201A WAC) is a state regulation designed to protect the beneficial uses of the surface waters of the state. Water quality-based effluent limitations may be based on an individual waste load allocation (WLA) or on a WLA developed during a basin-wide total maximum daily loading study (TMDL).

NUMERICAL CRITERIA FOR THE PROTECTION OF AQUATIC LIFE

"Numerical" water quality criteria are numerical values set forth in the State of Washington's water quality standards for surface waters (Chapter 173-201A WAC). They specify the levels of pollutants allowed in a receiving water body while remaining protective of aquatic life. Numerical criteria set forth in the water quality standards are used along with chemical and physical data for the waste water and receiving water to derive the effluent limits in the discharge permit. When surface water quality-based limits are more stringent or potentially more stringent than technology-based limitations, they must be used in a permit.

NUMERICAL CRITERIA FOR THE PROTECTION OF HUMAN HEALTH

The state was issued 91 numeric water quality criteria for the protection of human health by the U.S. EPA (EPA 1992). These criteria are designed to protect humans from cancer and other disease and are primarily applicable to fish and shellfish consumption and drinking water from surface waters.

NARRATIVE CRITERIA

In addition to numerical criteria, "narrative" water quality criteria (WAC 173-201A-030) limit toxic, radioactive, or deleterious material concentrations below those which have the potential to adversely affect characteristic water uses, cause acute or chronic toxicity to biota, impair aesthetic values, or adversely affect human health. Narrative criteria protect the specific beneficial uses of all fresh (WAC 173-201A-130) and marine (WAC 173-201A-140) waters in the state of Washington.

ANTIDegradation

The State of Washington's Antidegradation Policy requires that discharges into a receiving water body shall not further degrade the existing water quality of the water body. In cases where the natural conditions of a receiving water body are of lower quality than the criteria assigned, the natural conditions shall constitute the water quality criteria. Similarly, when the natural conditions of a receiving water are of higher quality than the criteria assigned, the natural conditions shall constitute the water quality criteria. More information on the State Antidegradation Policy can be obtained by referring to WAC 173-201A-070.

The Department has reviewed existing records and is unable to determine if ambient water quality is either higher or lower than the designated classification criteria given in Chapter 173-201A WAC; therefore, the Department will use the designated classification criteria for this water body in the proposed permit. The discharges authorized by this proposed permit should not cause a loss of beneficial uses.

CRITICAL CONDITIONS

Surface water quality-based limits are derived for the water body's critical condition, which represents the receiving water and waste discharge condition with the highest potential for adverse impact on the aquatic biota, human health, and existing or characteristic waterbody uses.

MIXING ZONES

The water quality standards allow the Department of Ecology to authorize mixing zones around a point of discharge in establishing surface water quality-based effluent limits. Both "acute" and "chronic" mixing zones may be authorized for pollutants that can have a toxic effect on the aquatic environment near the point of discharge. The concentration of pollutants at the boundary of these mixing zones may not exceed the numerical criteria for that type of zone. Mixing zones can only be authorized for discharges that are receiving all known, available and reasonable methods of prevention, control and treatment (AKART) and in accordance with other mixing zone requirements of WAC 173-201A-100.

The National Toxics Rule (EPA, 1992) allows the chronic mixing zone to be used to meet human health criteria.

DESCRIPTION OF THE RECEIVING WATER

The facility discharges to Gig Harbor, Puget Sound, which is designated as a Class AA marine water body in the vicinity of the outfall. Characteristic uses include the following:

water supply (domestic, industrial, agricultural); stock watering; fish migration; fish and shellfish rearing, spawning and harvesting; wildlife habitat; primary contact recreation; sport fishing; boating and aesthetic enjoyment; commerce and navigation.

Water quality of this class shall markedly and uniformly exceed the requirements for all or substantially all uses.

SURFACE WATER QUALITY CRITERIA

Applicable criteria are defined in Chapter 173-201A WAC for aquatic biota. In addition, U.S. EPA has promulgated human health criteria for toxic pollutants (EPA 1992). Criteria for this discharge are summarized below:

Surface Water Quality Criteria for Class AA Marine Waters:

Parameter	Criteria
Fecal Coliforms	14 organisms/100 mL maximum geometric mean
Dissolved Oxygen	7 mg/L minimum
Temperature	13 degrees Celsius maximum
pH	7.0 to 8.5 standard units
Turbidity	Less than 5 NTU above background
Toxics	No toxics in toxic amounts

CONSIDERATION OF SURFACE WATER QUALITY-BASED LIMITS FOR NUMERIC CRITERIA

Pollutant concentrations in the proposed discharge exceed water quality criteria with technology-based controls which the Department has determined to be AKART. A mixing zone is authorized in accordance with the geometric configuration, flow restriction, and other restrictions for mixing zones in Chapter 173-201A WAC. Mixing zone boundaries for discharges to estuaries such as Gig Harbor are defined as follows:

- (a) In estuaries, mixing zones, singularly or in combination with other mixing zones, shall:
 - (i) Not extend in any horizontal direction from the discharge port(s) for a distance greater than two hundred feet plus the depth of water over the discharge port(s) as measured during mean lower low water; and
 - (ii) Not occupy greater than twenty-five percent of the width of the water body as measured during mean lower low water.
- (b) In estuarine waters, a zone where acute criteria may be exceeded shall not extend beyond ten percent of the distance established in (a) above, as measured independently from the discharge port(s).
- (c) Vertical limitations for both chronic and acute zones is the depth of water over the discharge port(s) as measured during mean lower low water.

The acute and chronic mixing zone boundaries for the facility discharge are determined based on the above definitions and are specified in Condition S1.B of the proposed permit.

The dilution ratios of effluent to receiving water that occur within these zones have been determined at the critical condition by using the EPA computer model PLUMES and conducting a dye tracer study. A report titled "*S9 Effluent Mixing Study NPDES Permit Number WA0023957*," Cosmopolitan Engineering Group, submitted by the City in March 1998 includes the model runs, the results of the dye tracer study, and the dilution ratios calculations. Based on the PLUMES model and the dye tracer study, the dilution ratios for the facility discharge to Gig Harbor, Puget Sound, are as follows:

Dilution Ratios:

Criteria	Acute	Chronic
Aquatic Life	19:1	44:1

Pollutants in an effluent may affect the aquatic environment near the point of discharge (near-field) or at a considerable distance from the point of discharge (far-field). Toxic pollutants, for example, are near-field pollutants—their adverse effects diminish rapidly with mixing in the receiving water. Conversely, a pollutant such as BOD is a far-field pollutant whose adverse effect occurs away from the discharge even after dilution has occurred. Thus, the method of calculating water quality-based effluent limits varies with the point at which the pollutant has its maximum effect.

The derivation of water quality-based limits also takes into account the variability of the pollutant concentrations in both the effluent and the receiving water.

As required in the existing permit, the Permittee has been conducting receiving water quality sampling and monitoring every year in August and October, to assess the impacts of the facility's discharge on the waters of Gig Harbor. To date, the results are available for the sampling and monitoring during the years 1997 through 2003. The results are presented in study reports titled "*S12 Receiving Water Quality Monitoring Report*," prepared by Cosmopolitan Engineering Group. Various parameters including temperature, pH, dissolved oxygen (DO), nutrients and trace metals are monitored every year in August and October.

The long-term water quality monitoring study conducted by the Permittee indicates an increasing trend in ammonia concentration in Gig Harbor over the years. Since the treatment facility discharge is the principal source of ammonia in Gig Harbor, the ammonia concentrations would tend to increase as the flows from the treatment facility increase. The effluent mixing study conducted by the Permittee concluded that water quality standards may be exceeded when flows from the treatment facility increase above the existing design capacity. The Permittee is currently in the planning stage to relocate the outfall from inside the harbor to the open waters in Colvos Passage. An Outfall Engineering Report submitted by the Permittee was approved by the Department on December 22, 2003. The proposed new outfall is a 24-inch diameter pipe with a 540 feet long diffuser to a discharge depth of approximately 190 feet in Colvos Passage.

The results of the yearly sampling and monitoring are briefly discussed below. Also, discussed below are the impacts of the facility's discharge on receiving water's temperature, dissolved oxygen (DO), pH, fecal coliform, chlorine, ammonia, and metals.

Temperature—The water quality standards (WAC 173-201A) for Class AA marine waters specify that temperature in marine waters shall not exceed 13° C due to human activities. When natural conditions exceed 13° C, no temperature increases are to be allowed which will raise the receiving water temperature by greater than 0.3° C. The receiving water quality monitoring results show several incidents of temperature greater than 13° C in Gig Harbor in the month of August, at sampling stations located both near, and at some distance from the outfall discharge. During some sampling events in August, the temperature in Gig Harbor waters was higher away from the outfall than near the outfall. The sampling events in August also showed temperatures greater than 13° C in the open waters of Tacoma Narrows, indicating that high temperatures

(greater than 13°C) in Gig Harbor may be the result of natural conditions. The yearly monitoring study results indicate that the waters of Gig Harbor suffer from high temperature problems during the month of August, and to some extent, the treatment facility discharge may be exacerbating the high temperature problems.

The impact of temperature was modeled using the calculations from EPA, 1988. The input variables were dilution ratio of 44:1, and effluent temperature 23°C. Assuming a background temperature of 13°C, this would result in ambient temperature of 13.2°C at the edge of the mixing zone. The predicted rise in ambient temperature under critical conditions is less than 0.3°C, the maximum rise allowed by the water quality standards. Therefore, under critical conditions, there is no predicted violation of the water quality standards for temperature for surface waters.

As stated earlier, the Permittee is currently in the planning stage to relocate the outfall from inside the harbor to the open waters in Colvos Passage. This will virtually eliminate the impacts of the treatment facility's discharge on the water quality of Gig Harbor.

DO—The water quality standards (WAC 173-201A) for Class AA marine waters specify that DO concentration in marine waters shall exceed 7.0 mg/l. When natural conditions, such as upwelling, occur, causing the DO concentration to be depressed near or below 7.0 mg/l, natural DO concentration levels may be degraded by up to 0.2 mg/l by human-caused activities. The receiving water quality monitoring results show several incidents of DO concentration less than 7.0 mg/l in Gig Harbor during the month of October, at sampling stations located both near, and at some distance, from the outfall. The sampling events in October also showed DO concentrations less than 7.0 mg/l in the open waters of Tacoma Narrows, indicating that low DO concentrations (less than 7.0 mg/l) in Gig Harbor may be the result of natural conditions. The monitoring results show that DO concentrations in Gig Harbor were generally greater than 7.0 mg/l during the month of August due to high plankton productivity caused by warm temperatures and presence of nutrients in the harbor. The yearly monitoring study results indicate that the waters of Gig Harbor suffer from low DO (less than 7.0 mg/l) concentration problems during the month of October. It is not clear as to what extent the treatment facility effluent is contributing to the low DO problems in October.

As stated earlier, the Permittee is currently in the planning stage to relocate the outfall from inside the harbor to the open waters in Colvos Passage. This will virtually eliminate the impacts of the treatment facility's discharge on the water quality of Gig Harbor.

pH—The pH in Gig Harbor remained within the water quality standards (7.0 to 8.5) during all the sampling periods.

Fecal coliform—Three events of high fecal coliform concentration in surface water samples near the facility outfall were measured during the water quality sampling and monitoring from 1997 to 2003. Two of these events occurred on days when the treatment facility had high fecal coliform concentration in the effluent.

The numbers of fecal coliform were modeled by simple mixing analysis using the technology-based limit of 400 organisms per 100 ml and a dilution ratio of 44:1. Assuming a background fecal coliform concentration of 0, this would result in a fecal coliform concentration of 10 at the edge of the mixing zone.

Under critical conditions, there is no predicted violation of the water quality standards for surface waters with the technology-based limit. Therefore, the technology-based effluent limitations for fecal coliform bacteria were placed in the proposed permit.

Toxic Pollutants—Federal regulations (40 CFR 122.44) require NPDES permits to contain effluent limits for toxic chemicals in an effluent whenever there is a reasonable potential for those chemicals to exceed the surface water quality criteria. This process occurs concurrently with the derivation of technology-based effluent limits. Facilities with technology-based effluent limits defined in regulation are not exempted from meeting the water quality standards for surface waters or from having surface water quality-based effluent limits.

The following toxics were determined to be present in the discharge: ammonia, chlorine, chromium, copper, cyanide, lead, and zinc. A reasonable potential analysis (see Appendix E) was conducted on these parameters to determine whether or not effluent limitations would be required in this permit.

The determination of the reasonable potential for ammonia, chlorine, chromium, copper, cyanide, lead, and zinc to exceed the water quality criteria was evaluated with procedures given in EPA, 1991 (Appendix C) at the critical condition. The dilution ratios used in the critical condition modeling are as follows: (i) acute dilution ratio of 19:1 and (ii) chronic dilution ratio of 44:1.

Valid ambient background data was available for ammonia, copper, lead, and zinc. Calculations using all applicable data indicate that only cyanide in the effluent has a reasonable potential to cause a violation of water quality standards. However, the effluent cyanide was measured as total cyanide and not weak acid dissociable cyanide. The water quality standards for cyanide are expressed in terms of weak acid dissociable cyanide. In addition, only one out of eight effluent samples showed cyanide above the method detection limit (MDL). The rest are below the MDL. The sample that measured above the MDL was collected on May 26, 1998. Since then, no cyanide has been detected in the effluent samples. No cyanide has been detected in the influent samples either. It appears that cyanide measurement of 0.021 mg/l in the May 26, 1998, effluent sample is an anomaly, or a sporadic incident resulting from an illegal discharge. Therefore, cyanide limits are not proposed in this permit. To confirm presence or absence of cyanide in the effluent, and to determine reasonable potential for effluent to cause a violation of water quality standards for cyanide, Condition S2.A of the proposed permit requires the Permittee to sample and analyze for weak acid dissociable cyanide as part of the next NPDES permit application requirements.

It should be noted as discussed earlier, that the long-term water quality monitoring study conducted by the Permittee indicates an increasing trend in ammonia concentration in Gig Harbor over the years. Since the treatment facility discharge is the principal source of ammonia in Gig Harbor, the ammonia concentrations would tend to increase as the flows from the treatment facility increase. The effluent mixing study conducted by the Permittee concluded that water quality standards may be exceeded when flows from the treatment facility increase above the existing design capacity.

It should be noted that the recent modifications at the facility allow operation of the aeration basins in either a complete mix activated sludge system mode or an extended aeration system mode. The facility is now operated in an extended aeration mode during the warm summer months, which has considerably reduced effluent ammonia concentrations discharging to Gig Harbor.

The existing permit has chlorine limits for the discharge based on the reasonable potential analysis conducted during the development of the permit. The effluent limits for chlorine in the existing permit are: (i) average monthly limit is 0.11 mg/l, and (ii) maximum daily limit is 0.22 mg/l. Since there is no reasonable potential for this discharge to cause a violation of water quality standards for chlorine, the same water quality-based effluent limits for chlorine are placed in the proposed permit.

WHOLE EFFLUENT TOXICITY

The water quality standards for surface waters require that the effluent not cause toxic effects in the receiving waters. Many toxic pollutants cannot be detected by commonly available detection methods. However, toxicity can be measured directly by exposing living organisms to the waste water in laboratory tests and measuring the response of the organisms. Toxicity tests measure the aggregate toxicity of the whole effluent, and therefore this approach is called whole effluent toxicity (WET) testing. Some WET tests measure acute toxicity and other WET tests measure chronic toxicity.

Acute toxicity tests measure mortality as the significant response to the toxicity of the effluent. Dischargers who monitor their waste water with acute toxicity tests are providing an indication of the potential lethal effect of the effluent to organisms in the receiving environment.

Chronic toxicity tests measure various sublethal toxic responses such as retarded growth or reduced reproduction. Chronic toxicity tests often involve either a complete life cycle test of an organism with an extremely short life cycle or a partial life cycle test on a critical stage of one of a test organism's life cycles. Organism survival is also measured in some chronic toxicity tests.

Accredited WET testing laboratories have the proper WET testing protocols, data requirements, and reporting format. Accredited laboratories are knowledgeable about WET testing and capable of calculating an NOEC, LC₅₀, EC₅₀, IC₂₅, etc. All accredited labs have been provided the most recent version of the Department of Ecology Publication # WQ-R-95-80, *Laboratory Guidance and Whole Effluent Toxicity Test Review Criteria*, which is referenced in the permit. Any Permittee interested in receiving a copy of this publication may call the Ecology Publications Distribution Center, 360-407-7472, for a copy. Ecology recommends that Permittees send a copy of the acute or chronic toxicity sections(s) of their permits to their laboratory of choice.

The WET tests conducted during effluent characterization as required in the existing permit, indicate that no reasonable potential exists to cause receiving water acute or chronic toxicity. The Permittee will not be given an acute or a chronic WET limit and will only be required to retest the effluent as required by Part E (Toxicity Testing Data) of the EPA Form 3510-2A (NPDES application).

If the Permittee makes process or material changes which, in the Department's opinion, results in an increased potential for effluent toxicity, then the Department may require additional effluent characterization in a regulatory order, by permit modification, or in the permit renewal. Toxicity is assumed to have increased if WET testing conducted for submission with a permit application fails to meet the performance standards in WAC 173-205-020, "whole effluent toxicity performance standard." The Permittee may demonstrate to the Department that changes have not increased effluent toxicity by performing additional WET testing after the time the process or material changes have been made.

HUMAN HEALTH

Washington's water quality standards now include 91 numeric health-based criteria that must be considered in NPDES permits. These criteria were promulgated for the state by the U.S. EPA in its National Toxics Rule (Federal Register, Volume 57, No. 246, Tuesday, December 22, 1992).

From September 1997 to August 2001, the Permittee sampled and analyzed the facility effluent for priority pollutants as required by the existing permit. Some parameters were analyzed five times and some eight times during this period. Of the pollutants listed in the National Toxics Rule, six were found in the effluent. The six pollutants detected in the effluent are cyanide, bromoform, chloroform, toluene, phenol and bis(2-ethylhexyl)phthalate.

A determination of the discharge's potential to cause an exceedance of the water quality standards was conducted as required by 40 CFR 122.44(d). The reasonable potential determination was evaluated with procedures given in the Technical Support Document for Water Quality-based Toxics Control (EPA/505/2-90-001) and the Department's *Permit Writer's Manual* (Ecology Publication 92-109, July 1994). The reasonable potential to exceed the human health-based criteria for the six pollutants found in the effluent is included in Appendix E. The determination indicated that the discharge has no reasonable potential to cause a violation of human health-based water quality standards, thus an effluent limit is not warranted.

SEDIMENT QUALITY

The Department has promulgated aquatic sediment standards (Chapter 173-204 WAC) to protect aquatic biota and human health. These standards state that the Department may require Permittees to evaluate the potential for the discharge to cause a violation of applicable standards (WAC 173-204-400).

The Department has determined through a review of the discharger characteristics and effluent characteristics that this discharge has no reasonable potential to violate the sediment management standards.

GROUND WATER QUALITY LIMITATIONS

The Department has promulgated ground water quality standards (Chapter 173-200 WAC) to protect uses of ground water. Permits issued by the Department shall be conditioned in such a manner so as not to allow violations of those standards (WAC 173-200-100).

This Permittee has no discharge to ground and, therefore, no limitations are required based on potential effects to ground water.

COMPARISON OF PROPOSED EFFLUENT LIMITS WITH THE EXISTING EFFLUENT LIMITS

The following table compares the proposed effluent limits with the existing effluent limits. The proposed limits are identical to the existing effluent limits, except for the substitution of the standard BOD₅ limits with CBOD₅ limits as allowed by the federal and state regulations.

Effluent Limits:

Parameter	Existing Effluent Limits	Proposed Effluent Limits
BOD ₅	30 mg/L, 400 lbs./day (Monthly Average)	
CBOD ₅		25 mg/L, 334 lbs./day (Monthly Average)
TSS	30 mg/L, 400 lbs./day (Monthly Average)	30 mg/L, 400 lbs./day (Monthly Average)
Fecal Coliform	200/100 mL (Monthly Average)	200/100 mL (Monthly Average)
pH	6.0 to 9.0	6.0 to 9.0
Chlorine Residual	0.11 mg/l (Monthly Average)	0.11 mg/l (Monthly Average)

MONITORING REQUIREMENTS

Monitoring, recording, and reporting are required (WAC 173-220-210 and 40 CFR 122.41) to verify that the treatment process is functioning correctly and the effluent limitations are being achieved.

Monitoring for total ammonia is being required to further characterize the effluent. In addition, the effluent ammonia results will be used in the long-term trend analysis for ammonia concentration in Gig Harbor. Toxic pollutants monitoring of the effluent is included in the proposed permit as required by Part D (Expanded Effluent Testing Data) of the NPDES permit application. Whole effluent toxicity monitoring of the effluent is included in the proposed permit as required by Part E (Toxicity Testing Data) of the NPDES permit application.

The monitoring schedule is detailed in the proposed permit under Condition S2. Specified monitoring frequencies take into account the quantity and variability of discharge, the treatment method, past compliance, significance of pollutants, and cost of monitoring. The required monitoring frequency is consistent with agency guidance given in the current version of Ecology's *Permit Writer's Manual* (July 2002) for activated sludge plants with less than 2 million gallons per day (MGD) average design flow.

LAB ACCREDITATION

With the exception of certain parameters, the permit requires all monitoring data to be prepared by a laboratory registered or accredited under the provisions of Chapter 173-50 WAC, *Accreditation of Environmental Laboratories*. The laboratory at this facility is accredited for CBOD₅, BOD₅, total suspended solids, dissolved oxygen (DO), residual chlorine, fecal coliform bacteria, and pH.

RECEIVING WATER QUALITY MONITORING

Section S10 of the proposed permit includes sampling and monitoring of the receiving waters to ensure that the discharge from the facility does not violate the applicable receiving water quality standards. In addition, it will provide data that can be used to monitor long-term water quality trends in Gig Harbor due to the effects of the discharge from the facility. Certain pollutants and parameters were chosen for monitoring due to their value as indicators of the health of the receiving water environment. Evaluating the results of monitoring for these parameters will allow the Department to determine the effects on receiving water quality due to the discharge from the facility.

Sampling and monitoring is required at five stations as follows:

- (1) Station Number 1 - in Tacoma Narrows, off the entrance to the bay
- (2) Station Number 2 - southeastern-most of two stations in Gig Harbor
- (3) Station Number 3 - northwestern-most of two stations in Gig Harbor
- (4) Station Number 4 - Crescent Creek
- (5) Station Number 5 - final effluent weir at the facility

The sampling and monitoring will consist of weekly sampling, monthly comprehensive sampling, and continuous near-bottom dissolved oxygen monitoring.

Weekly sampling and monitoring is required for indicator parameters (temperature, dissolved oxygen, pH, and transparency) at a station near the outfall location in Gig Harbor beginning the last full week in July and continuing through the end of September. The weekly sampling and analyses will be used to identify “critical conditions” for algae blooms, which are characterized by elevated temperature, elevated surface DO, elevated surface pH, and reduced transparency. When these parameters indicate that a substantial algae bloom is occurring, or near-bottom dissolved oxygen is reduced, the Permittee is required to begin monthly comprehensive sampling.

The monthly comprehensive sampling and monitoring is required to be conducted at all five stations on three separate occasions: in August, September, and during the last full week in October. The samples are to be collected close to the time of “critical conditions,” as determined from the weekly sampling. The monthly monitoring is more comprehensive with more parameters to be monitored in order to determine the effects of the facility’s discharge on the receiving water quality.

In addition to the weekly and comprehensive monthly sampling and monitoring, the permit requires continuous near-bottom dissolved oxygen monitoring for two weeks at or near the weekly-monitoring station in Gig Harbor twice annually, in August and September.

OTHER PERMIT CONDITIONS

REPORTING AND RECORDKEEPING

The conditions of S3 are based on the authority to specify any appropriate reporting and recordkeeping requirements to prevent and control waste discharges (WAC 173-220-210).

PREVENTION OF FACILITY OVERLOADING

Overloading of the treatment plant is a violation of the terms and conditions of the permit. To prevent this from occurring, RCW 90.48.110 and WAC 173-220-150 require the Permittee to take the actions detailed in proposed permit requirement S4 to plan expansions or modifications before existing capacity is reached and to report and correct conditions that could result in new or increased discharges of pollutants. Condition S4 restricts the amount of flow.

OPERATION AND MAINTENANCE (O&M)

The proposed permit contains Condition S5 as authorized under RCW 90.48.110, WAC 173-220-150, Chapter 173-230 WAC, and WAC 173-240-080. It is included to ensure proper operation and regular maintenance of equipment, and to ensure that adequate safeguards are taken so that constructed facilities are used to their optimum potential in terms of pollutant capture and treatment.

RESIDUAL SOLIDS HANDLING

To prevent water quality problems, the Permittee is required in permit Condition S7 to store and handle all residual solids (grit, screenings, scum, sludge, and other solid waste) in accordance with the requirements of RCW 90.48.080 and state water quality standards.

The final use and disposal of sewage sludge from this facility is regulated by U.S. EPA under 40 CFR 503. The disposal of other solid waste is under the jurisdiction of the Pierce County Health Department.

PRETREATMENT

Primary sources of wastewater tributary to the facility are domestic sewage from residential and light commercial activities in the service area. Since the pretreatment program has not been delegated to the Permittee, the pretreatment condition S8 in the permit is a standard condition derived from the Federal Regulation 40 CFR 403.5.

ADDITIONAL TESTING OF EFFLUENT

To provide the required data for Part B6 of the NPDES permit application for the next permit cycle, Condition S11.A of the permit requires additional monitoring of final effluent for some conventional pollutants.

GENERAL CONDITIONS

General Conditions are based directly on state and federal law and regulations and have been standardized for all individual municipal NPDES permits issued by the Department.

PERMIT ISSUANCE PROCEDURES

PERMIT MODIFICATIONS

The Department may modify this permit to impose numerical limitations, if necessary, to meet water quality standards, sediment quality standards, or ground water standards, based on new information obtained from sources such as inspections, effluent monitoring, outfall studies, and effluent mixing studies.

The Department may also modify this permit as a result of new or amended state or federal regulations.

RECOMMENDATION FOR PERMIT ISSUANCE

This proposed permit meets all statutory requirements for authorizing a wastewater discharge, including those limitations and conditions believed necessary to protect human health, aquatic life, and the beneficial uses of waters of the state of Washington. The Department proposes that this permit be issued for the full allowable five (5)-year period.

REFERENCES FOR TEXT AND APPENDICES

Environmental Protection Agency (EPA)

1991. Technical Support Document for Water Quality-based Toxics Control.
EPA/505/2-90-001.

Washington State Department of Ecology

1994. Permit Writer's Manual. Publication Number 92-109

City of Gig Harbor

1994. Wastewater Treatment Plant Facility Plan, Gray and Osborne, Inc.

1997 - 2003. S12 Receiving Water Quality Monitoring Program, Cosmopolitan Engineering Group

1998. S9 Effluent Mixing Study, Cosmopolitan Engineering Group

2003. Wastewater Treatment Plant Improvements Engineering Report, H.R. Esvelt Engineering

2003. Receiving Water Quality Monitoring, Sampling and Analysis Plan, Cosmopolitan Engineering Group

APPENDIX A—PUBLIC INVOLVEMENT INFORMATION

The Department has tentatively determined to reissue a permit to the applicant listed on page one of this fact sheet. The permit contains conditions and effluent limitations which are described in the rest of this fact sheet.

Public Notice of Application (PNOA) was published on September 5 and 12, 2001, in the *Peninsula Gate Way*, and on September 4 and 11, 2001, in the *Tacoma Tribune* and *Bremerton Sun* to inform the public that an application had been submitted and to invite comment on the reissuance of this permit.

The Department published a Public Notice of Draft (PNOD) on June 17, 2004, in *The News Tribune* to inform the public that a draft permit and fact sheet were available for review. Interested persons were invited to submit written comments regarding the draft permit. The draft permit, fact sheet, and related documents were available for inspection and copying between the hours of 8:00 a.m. and 5:00 p.m. weekdays, by appointment, at the regional office listed below. Written comments were mailed to:

Water Quality Permit Coordinator
Department of Ecology
Northwest Regional Office
3190 160th Avenue SE
Bellevue, WA 98008-5452.

Any interested party may comment on the draft permit or request a public hearing on this draft permit within the thirty (30)-day comment period to the address above. The request for a hearing shall indicate the interest of the party and the reasons why the hearing is warranted. The Department will hold a hearing if it determines there is a significant public interest in the draft permit (WAC 173-220-090). Public notice regarding any hearing will be circulated at least thirty (30) days in advance of the hearing. People expressing an interest in this permit will be mailed an individual notice of hearing (WAC 173-220-100).

Comments should reference specific text followed by proposed modification or concern when possible. Comments may address technical issues, accuracy and completeness of information, the scope of the facility's proposed coverage, adequacy of environmental protection, permit conditions, or any other concern that would result from issuance of this permit.

The Department will consider all comments received within thirty (30) days from the date of public notice of draft indicated above, in formulating a final determination to issue, revise, or deny the permit. The Department's response to all significant comments is available upon request and will be mailed directly to people expressing an interest in this permit.

Further information may be obtained from the Department by telephone, (425) 649-7201, or by writing to the address listed above.

APPENDIX B—GLOSSARY

Acute Toxicity—The lethal effect of a pollutant on an organism that occurs within a short period of time, usually 48 to 96 hours.

AKART—An acronym for “all known, available, and reasonable methods of prevention, control, and treatment.”

Ambient Water Quality—The existing environmental condition of the water in a receiving water body.

Ammonia—Ammonia is produced by the breakdown of nitrogenous materials in waste water. Ammonia is toxic to aquatic organisms, exerts an oxygen demand, and contributes to eutrophication. It also increases the amount of chlorine needed to disinfect wastewater.

Average Monthly Discharge Limitation—The highest allowable average of daily discharges over a calendar month, calculated as the sum of all daily discharges measured during a calendar month divided by the number of daily discharges measured during that month (except in the case of fecal coliform). The daily discharge is calculated as the average measurement of the pollutant over the day.

Average Weekly Discharge Limitation—The highest allowable average of daily discharges over a calendar week, calculated as the sum of all daily discharges measured during a calendar week divided by the number of daily discharges measured during that week. The daily discharge is calculated as the average measurement of the pollutant over the day.

Best Management Practices (BMPs)—Schedules of activities, prohibitions of practices, maintenance procedures, and other physical, structural and/or managerial practices to prevent or reduce the pollution of waters of the State. BMPs include treatment systems, operating procedures, and practices to control: plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage. BMPs may be further categorized as operational, source control, erosion and sediment control, and treatment BMPs.

BOD₅—Determining the biochemical oxygen demand of an effluent is an indirect way of measuring the quantity of organic material present in an effluent that is utilized by bacteria. The BOD₅ is used in modeling to measure the reduction of dissolved oxygen in a receiving water after effluent is discharged. Stress caused by reduced dissolved oxygen levels makes organisms less competitive and less able to sustain their species in the aquatic environment. Although BOD is not a specific compound, it is defined as a conventional pollutant under the federal Clean Water Act.

Bypass—The intentional diversion of waste streams from any portion of a treatment facility.

CBOD₅—The quantity of oxygen utilized by a mixed population of microorganisms acting on the nutrients in the sample in an aerobic oxidation for five days at a controlled temperature of 20 degrees Celcius, with an inhibitory agent added to prevent the oxidation of nitrogen compounds. The method for determining CBOD₅ is given in 40 CFR Part 136.

Chlorine—Chlorine is used to disinfect waste waters of pathogens harmful to human health. It is also extremely toxic to aquatic life.

FACILITY NAME: *Gig Harbor Wastewater Treatment Plant*

Chronic Toxicity—The effect of a pollutant on an organism over a relatively long time, often 1/10 of an organism's lifespan or more. Chronic toxicity can measure survival, reproduction or growth rates, or other parameters to measure the toxic effects of a compound or combination of compounds.

Clean Water Act (CWA) —The Federal Water Pollution Control Act enacted by Public Law 92-500, as amended by Public Laws 95-217, 95-576, 96-483, 97-117; USC 1251 et seq.

Combined Sewer Overflow (CSO)—The event during which excess combined sewage flow caused by inflow is discharged from a combined sewer, rather than conveyed to the sewage treatment plant because either the capacity of the treatment plant or the combined sewer is exceeded.

Compliance Inspection - Without Sampling—A site visit for the purpose of determining the compliance of a facility with the terms and conditions of its permit or with applicable statutes and regulations.

Compliance Inspection - With Sampling—A site visit to accomplish the purpose of a Compliance Inspection - Without Sampling and as a minimum, sampling and analysis for all parameters with limits in the permit to ascertain compliance with those limits; and, for municipal facilities, sampling of influent to ascertain compliance with the percent removal requirement. Additional sampling may be conducted.

Composite Sample—A mixture of grab samples collected at the same sampling point at different times, formed either by continuous sampling or by mixing a minimum of four discrete samples. May be "time-composite" (collected at constant time intervals) or "flow-proportional" (collected either as a constant sample volume at time intervals proportional to stream flow, or collected by increasing the volume of each aliquot as the flow increased while maintaining a constant time interval between the aliquots).

Construction Activity—Clearing, grading, excavation, and any other activity which disturbs the surface of the land. Such activities may include road building; construction of residential houses, office buildings, or industrial buildings; and demolition activity.

Continuous Monitoring—Uninterrupted, unless otherwise noted in the permit.

Critical Condition—The time during which the combination of receiving water and waste discharge conditions have the highest potential for causing toxicity in the receiving water environment. This situation usually occurs when the flow within a water body is low, thus, its ability to dilute effluent is reduced.

Dilution Factor—A measure of the amount of mixing of effluent and receiving water that occurs at the boundary of the mixing zone. Expressed as the inverse of the effluent fraction e.g., a dilution factor of 10 means the effluent comprises 10% by volume and the receiving water 90%.

Engineering Report—A document which thoroughly examines the engineering and administrative aspects of a particular domestic or industrial wastewater facility. The report shall contain the appropriate information required in WAC 173-240-060 or 173-240-130.

Fecal Coliform Bacteria—Fecal coliform bacteria are used as indicators of pathogenic bacteria in the effluent that are harmful to humans. Pathogenic bacteria in wastewater discharges are controlled by disinfecting the wastewater. The presence of high numbers of fecal coliform bacteria in a water body can indicate the recent release of untreated waste water and/or the presence of animal feces.

Grab Sample—A single sample or measurement taken at a specific time or over as short a period of time as is feasible.

Industrial User—A discharger of waste water to the sanitary sewer which is not sanitary waste water or is not equivalent to sanitary waste water in character.

Industrial Wastewater—Water or liquid-carried waste from industrial or commercial processes, as distinct from domestic waste water. These wastes may result from any process or activity of industry, manufacture, trade or business; from the development of any natural resource; or from animal operations such as feed lots, poultry houses, or dairies. The term includes contaminated storm water and, also, leachate from solid waste facilities.

Infiltration and Inflow (I/I)—"Infiltration" means the addition of ground water into a sewer through joints, the sewer pipe material, cracks, and other defects. "Inflow" means the addition of precipitation-caused drainage from roof drains, yard drains, basement drains, street catch basins, etc., into a sewer.

Interference—A discharge which, alone or in conjunction with a discharge or discharges from other sources, both:

Inhibits or disrupts the POTW, its treatment processes or operations, or its sludge processes, use or disposal; and

Therefore is a cause of a violation of any requirement of the POTW's NPDES permit (including an increase in the magnitude or duration of a violation) or of the prevention of sewage sludge use or disposal in compliance with the following statutory provisions and regulations or permits issued thereunder (or more stringent State or local regulations): Section 405 of the Clean Water Act, the Solid Waste Disposal Act (SWDA) [including Title II, more commonly referred to as the Resource Conservation and Recovery Act (RCRA), and including State regulations contained in any State sludge management plan prepared pursuant to Subtitle D of the SWDA], sludge regulations appearing in 40 CFR Part 507, the Clean Air Act, the Toxic Substances Control Act, and the Marine Protection, Research and Sanctuaries Act.

Major Facility—A facility discharging to surface water with an EPA rating score of > 80 points based on such factors as flow volume, toxic pollutant potential, and public health impact.

Maximum Daily Discharge Limitation—The highest allowable daily discharge of a pollutant measured during a calendar day or any 24-hour period that reasonably represents the calendar day for purposes of sampling. The daily discharge is calculated as the average measurement of the pollutant over the day.

Method Detection Level (MDL)—The minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is above zero and is determined from analysis of a sample in a given matrix containing the analyte.

Minor Facility—A facility discharging to surface water with an EPA rating score of < 80 points based on such factors as flow volume, toxic pollutant potential, and public health impact.

Mixing—A volume that surrounds an effluent discharge within which water quality criteria may be exceeded. The area of the authorized mixing zone is specified in a facility's permit and follows procedures outlined in State regulations (Chapter 173-201A WAC).

National Pollutant Discharge Elimination System (NPDES)—The NPDES (Section 402 of the Clean Water Act) is the federal wastewater permitting system for discharges to navigable waters of the United States. Many states, including the state of Washington, have been delegated the authority to issue these permits. NPDES permits issued by Washington State permit writers are joint NPDES/State permits issued under both State and federal laws.

Pass through—A discharge which exits the POTW into waters of the state in quantities or concentrations which, alone or in conjunction with a discharge or discharges from other sources, is a cause of a violation of any requirement of the POTW's NPDES permit (including an increase in the magnitude or duration of a violation), or which is a cause of a violation of State water quality standards.

pH—The pH of a liquid measures its acidity or alkalinity. A pH of 7 is defined as neutral, and large variations above or below this value are considered harmful to most aquatic life.

Potential Significant Industrial User—A potential significant industrial user is defined as an industrial user which does not meet the criteria for a significant industrial user, but which discharges waste water meeting one or more of the following criteria:

- a. Exceeds 0.5 % of treatment plant design capacity criteria and discharges <25,000 gallons per day; or
- b. Is a member of a group of similar industrial users which, taken together, have the potential to cause pass-through or interference at the POTW (e.g. facilities which develop photographic film or paper, and car washes).

The Department may determine that a discharger initially classified as a potential significant industrial user should be managed as a significant industrial user.

Quantitation Level (QL)—A calculated value five times the MDL (method detection level).

Significant Industrial User (SIU)—

- 1) All industrial users subject to categorical pretreatment standards under 40 CFR 403.6 and 40 CFR Chapter I, Subchapter N; and
- 2) Any other industrial user that: discharges an average of 25,000 gallons per day or more of process waste water to the POTW (excluding sanitary, noncontact cooling, and boiler blow-down waste water); contributes a process waste stream that makes up 5 percent or more of the average dry weather hydraulic or organic capacity of the POTW treatment plant; or is designated as such by the Control Authority* on the basis that the industrial user has a reasonable potential for adversely affecting the POTW's operation or for violating any pretreatment standard or requirement [in accordance with 40 CFR 403.8(f)(6)].

FACILITY NAME: *Gig Harbor Wastewater Treatment Plant*

Upon finding that the industrial user meeting the criteria in paragraph 2, above, has no reasonable potential for adversely affecting the POTW's operation or for violating any pretreatment standard or requirement, the Control Authority* may at any time, on its own initiative or in response to a petition received from an industrial user or POTW, and in accordance with 40 CFR 403.8(f)(6), determine that such industrial user is not a significant industrial user.

*The term "Control Authority" refers to the Washington State Department of Ecology in the case of nondelegated POTWs or to the POTW in the case of delegated POTWs.

State Waters—Lakes, rivers, ponds, streams, inland waters, underground waters, salt waters, wetlands, and all other surface waters and watercourses within the jurisdiction of the state of Washington.

Stormwater—That portion of precipitation that does not naturally percolate into the ground or evaporate, but flows via overland flow, interflow, pipes, and other features of a storm water drainage system into a defined surface water body, or a constructed infiltration facility.

Technology-based Effluent Limit—A permit limit that is based on the ability of a treatment method to reduce the pollutant.

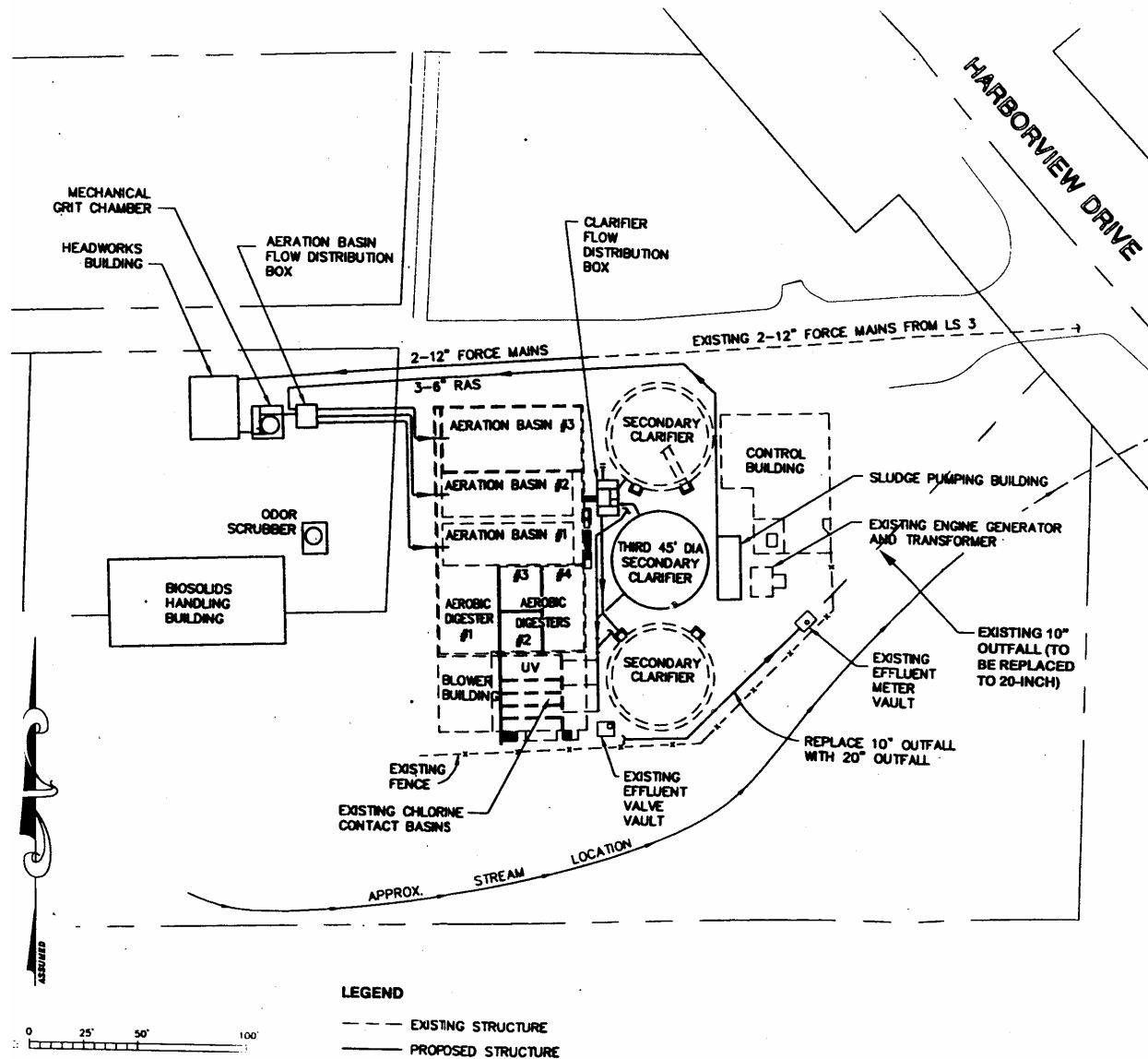
Total Suspended Solids (TSS)—Total suspended solids are the particulate materials in an effluent. Large quantities of TSS discharged to a receiving water may result in solids accumulation. Apart from any toxic effects attributable to substances leached out by water, suspended solids may kill fish, shellfish, and other aquatic organisms by causing abrasive injuries and by clogging the gills and respiratory passages of various aquatic fauna. Indirectly, suspended solids can screen out light and can promote and maintain the development of noxious conditions through oxygen depletion.

Upset—An exceptional incident in which there is unintentional and temporary noncompliance with technology-based permit effluent limitations because of factors beyond the reasonable control of the Permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, lack of preventative maintenance, or careless or improper operation.

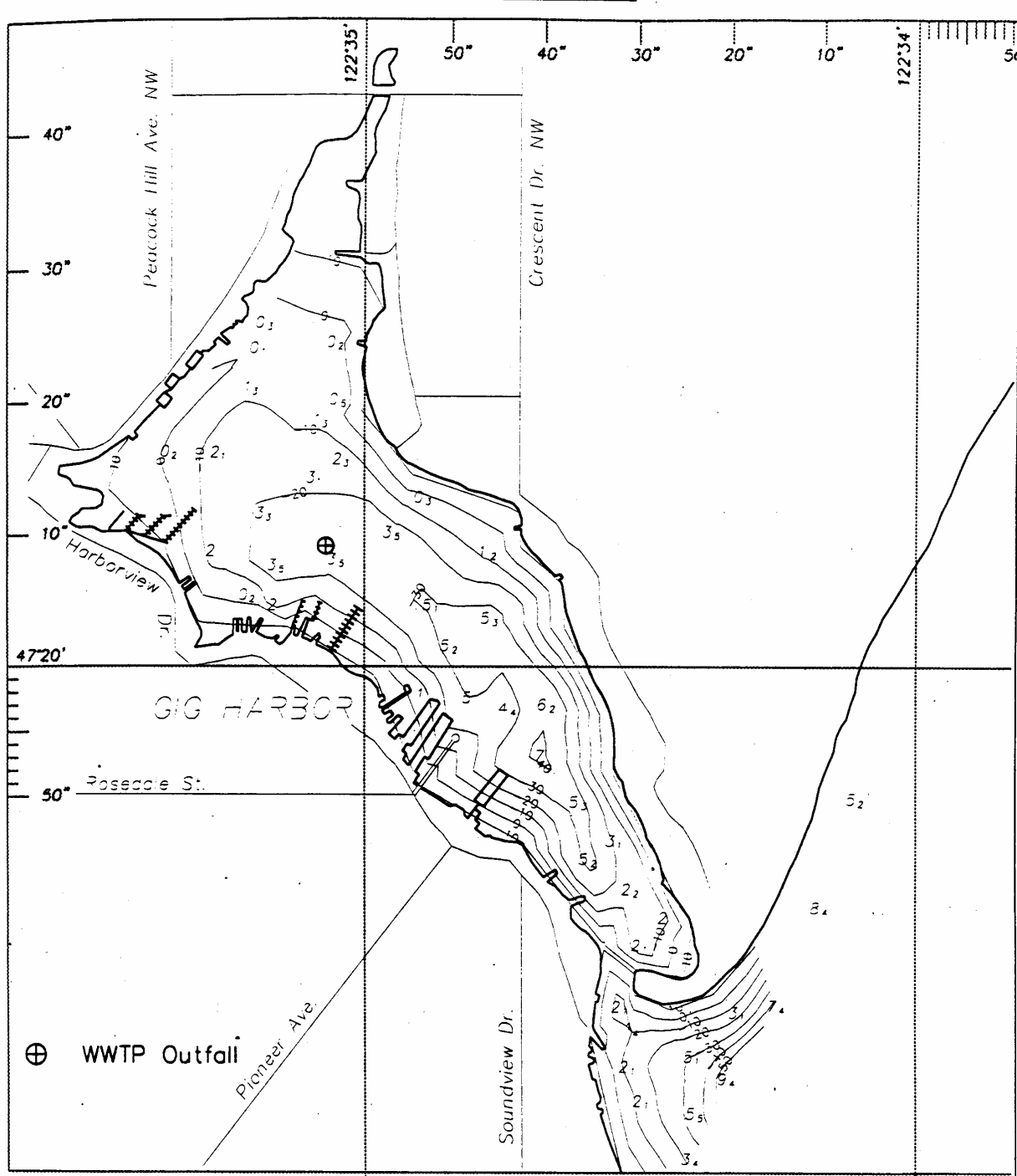
Water Quality-based Effluent Limit—A limit on the concentration or mass of an effluent parameter that is intended to prevent the concentration of that parameter from exceeding its water quality criterion after it is discharged into a receiving water.

APPENDIX C—TREATMENT FACILITY LAYOUT AND OUTFALL LOCATION

TREATMENT FACILITY LAYOUT



OUTFALL LOCATION



APPENDIX D—LIST OF POLLUTANTS FOR TESTING IN CONDITION S2.A(4)

EPA "PART D" NPDES APPLICATION FORM 2A TESTING REQUIREMENTS

The following pollutant scan data are required at the time of NPDES permit application for municipal treatment facilities with design flow greater than 1.0 mgd. At least three scans are to be conducted during the term of the permit. The metals are to be analyzed as “Total recoverable Metals” Section 4.1.4, Publication EPA-600/4-79-020, *Methods for Chemical Analysis of water and Wastes*, 1979. Please see Condition S2.A(4) of the permit.

METALS & MISC.	VOL. ORGANICS (Cont.)	BASE NEUTRALS (Cont.)
Antimony	Ethylbenzene	Bis (2-Chloroethyl)-Ether
Arsenic	Methyl Bromide	Bis (2-Chloroiso-Propyl) Ether
Beryllium	Methyl Chloride	Bis (2-Ethylhexyl) Phthalate
Cadmium	Methylene Chloride	4-Bromophenyl Phenyl Ether
Chromium	1,1,2,2-Tetrachloro-Ethane	Butyl Benzyl Phthalate
Copper	Tetrachloro-Ethylene	2-Chloronaphthalene
Lead	Toluene	4-Chlorophenyl Phenyl Ether
Mercury	1,1,1-Trichloroethane	Chrysene
Nickel	1,1,2-Trichloroethane	Di-N-Butyl Phthalate
Selenium	Trichlorethylene	Di-N-Octyl Phthalate
Silver	Vinyl Chloride	Dibenzo(A,H) Anthracene
Thallium		1,2-Dichlorobenzene
Zinc	ACID EXTRACTABLES	1,3-Dichlorobenzene
Cyanide	P-Chloro-M-Cresol	1,4-Dichlorobenzene
Total Phenolic Compounds	2-Chlorophenol	3,3-Dichlorobenzidine
Hardness (As CaCO ₃)	2,4-Dichlorophenol	Diethyl Phthalate
	2,4-Dimethylphenol	Dimethyl Phthalate
VOLATILE ORGANICS	4,6-Dinitro-O-Cresol	2,4-Dinitrotoluene
Acrolein	2,4-Dinitrophenol	2,6-Dinitrotoluene
Acrylonitrile	2-Nitrophenol	Fluoranthene
Benzene	4-Nitrophenol	Fluorene
Bromoform	Pentachlorophenol	Hexachlorobenzene
Carbon Tetrachloride	Phenol	Hexachlorobutadiene
Chlorobenzene	2,4,6-Trichlorophenol	Hexachlorocyclo-Pentadiene
Chlorodibromo-Methane		Hexachloroethane
Chloroethane	BASE NEUTRALS	Indeno(1,2,3-CD)Pyrene
2-Chloro-Ethylvinyl Ether	Acenaphthene	Isophorone
Chloroform	Acenaphthylene	Naphthalene
Dichlorobromo-Methane	Anthracene	Nitrobenzene
1,1-Dichloroethane	Benzidine	N-Nitrosodi-N-Propylamine
1,2-Dichloroethane	Benzo(A)Anthracene	N-Nitrosodi-Methylamine
Trans-1,2-Dichloro Ethylene	3,4 Benzo-Fluoranthene	N-Nitrosodi-Phenylamine
1,1-Dichloroethylene	Benzo(Ghi)Perylene	Phenanthrene
1,2-Dichloropropane	Benzo(K)Fluoranthene	Pyrene
1,3-Dichloro-Propylene	Bis (2-Chloroethoxy) Methane	1,2,4-Trichlorobenzene

APPENDIX E—REASONABLE POTENTIAL CALCULATIONS FOR TOXICS

Calculations to Determine Surface Water Quality Standards for Ammonia

Calculation of seawater fraction of un-ionized ammonia
from Hampson (1977). Un-ionized ammonia criteria for
salt water are from EPA 440/5-88-004.

Based on Lotus File NH3SALT.WK1 Revised 19-Oct-93

INPUTS	
1. Temperature (deg C):	17.0
2. pH:	8.2
3. Salinity (g/Kg):	25.5
CALCULATED	
1. Pressure (atm; EPA criteria assumes 1 atm):	1.0
2. Molal Ionic Strength (not valid if >0.85):	0.521
3. pKa8 at 25 deg C (Whitfield model "B"):	9.305
4. Percent of Total Ammonia Present as Unionized:	4.138%
5. Unionized ammonia criteria (mg un-ionized NH3 per liter) from EPA 440/5-88-004	
Acute:	0.233
Chronic:	0.035
6. Total Ammonia Criteria (mg/L as NH3)	
Acute:	5.63
Chronic:	0.85
7. Total Ammonia Criteria (mg/L as NH3-N)	
Acute:	4.63
Chronic:	0.70

FACILITY NAME: Gig Harbor Wastewater Treatment Plant

[illegible]

REASONABLE POTENTIAL CALCULATION FOR PROTECTION OF HUMAN HEALTH

Parameter	Ambient Concentration (Geometric Mean)	Water Quality Criteria for Protection of Human Health	Max concentration at edge of chronic mixing zone.	LIMIT REQ'D?	Expected Number of Compliance Samples per Month	AVERAGE MONTHLY EFFLUENT LIMIT	MAXIMUM DAILY EFFLUENT LIMIT	Estimated Percentile at 95% Confidence	Ph	Max effluent measured concentration	Coeff Variation	S	# of samples which was used in calculation	Calculated 95th percentile effluent concentration (Mean +1.9)	Dilution Factor	COMMENTS																
																	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
																	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Parameter CYANIDE		220000	0.35	NO	1	NONE	NONE	0.50	0.69	21.00	0.60	0.6	8	0.76	44	Cyanide is measured as Total Cyanide, not Weak Acid Dissociable Cyanide. 7 out of 8 samples below MDL.																
BROMOFORM		360	0.04	NO	1	NONE	NONE	0.50	0.55	2.00	0.60	0.6	5	0.93	44	4 out of 5 samples below MDL.																
CHLOROFORM		470	0.11	NO	1	NONE	NONE	0.50	0.55	5.00	0.60	0.6	5	0.93	44	3 out of 5 samples below MDL.																
TOLUENE		200000	0.06	NO	1	NONE	NONE	0.50	0.55	3.00	0.60	0.6	5	0.93	44	3 out of 5 samples below MDL.																
PHENOL		4600000	2.66	NO	1	NONE	NONE	0.50	0.79	200.00	0.60	0.6	13	0.69	44	9 out of 13 samples below MDL.																
BIS(2-ETHYL-HEXYL) PHTHALATE		5.9	0.25	NO	1	NONE	NONE	0.50	0.55	12.00	0.60	0.6	5	0.93	44	4 out of 5 samples below MDL.																

APPENDIX F—RESPONSE TO COMMENTS

No comments were received on the draft permit, during the thirty (30)-day comment period following the date of public notice in *The News Tribune*, a major local newspaper of general circulation serving the area where the facility discharge occurs.